Report of habitat monitoring conducted on the East Fork of the South Fork Trask River between 1998 and 2000

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Introduction

In July of 1998, monitoring was initiated in four stream segments in the East Fork of the South Fork Trask River watershed (Figure 1). This monitoring was designed to help measure the effectiveness of instream restoration work at providing habitat for salmonids. The initial monitoring had three goals: 1) Determine if placed wood remained stable over time, 2) determine if placed wood improved habitat conditions for salmonids, and 3) Determine if fish are utilizing the restored habitats.

Wood was placed in-channel in the treatment reaches during the summer of 1998. A helicopter was used to place the wood. In the unnamed tributary segment, the wood was naturally anchored in the stream channel while in the main stem segment the wood was cabled to itself and to the bed and banks of the stream channel. The wood that was placed was either whole trees with rootwads attached or large cut stumps.

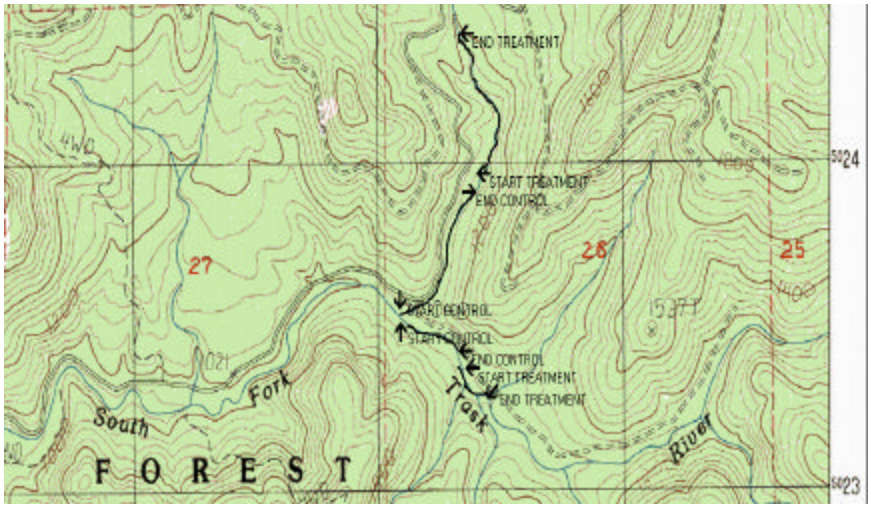

Figure 1. Location of the East Fork South Fork Trask River monitoring sites T2S-R7W-26W.

Methods

The basic monitoring plan for the East Fork South Fork Trask River project emphasized the monitoring of wood movement, habitat change and fish use at four stream segments. A treated area and a control area were located in a main stem segment, and another set of treatment and control areas were located in an unnamed tributary (Figure 1). The monitoring plan for the East Fork South Fork Trask River project was modified from a coast wide monitoring plan developed for the western Oregon Stream Project (Thom 1998). The East Fork South Fork Trask plan included additional activities which were:

- Marking all placed woody debris with an aluminum tag
- Pre and post treatment photos of wood placement locations
- Surveys of spawning salmonids

Habitat surveys were conducted using the methods of Moore et al. (1997). The survey methods were modified by measuring all unit lengths and widths and measuring channel metrics at five equally spaced intervals during the survey.

Habitat surveys were conducted during summer and winter during the two years of the monitoring project. Pre treatment surveys were only conducted during summer because the monitoring plan was developed after the restoration projects were planned. Post treatment data collected during the summer of 1999 was removed from the analysis due to quality control issues.

The analysis of the summer pre-treatment data and comparison to the winter post treatment data for the E. Fk. S. Fk. Trask River sites presented many challenges. The analysis was simplified to only look at the change in the treated reaches between the summer pre-treatment and winter 2000 post-treatment surveys. These differences were compared to the change in the control reaches over the same period. Any changes observed between the pre and post treatment surveys in the treated segments would have to be over and above any changes observed in the control segments over the same time frame for a treatment effect to be realized.

The East Fork Trask River Sites were also compared to other restoration monitoring sites to determine if the changes were consistent with other projects completed during the same period.

The attributes that were analyzed included:

- Channel area
- Percent secondary channel area
- Percent pool area
- Percent dammed pool area
- Deep pool density
- Riffle fine sediments
- Riffle gravel
- Total fine sediments
- Total gravel
- Wood piece density
- Wood volume density
- Key wood piece density
- Wood Jam Density

Results

Physical habitat monitoring was conducted at 11 sites during the period 1998-2000 (Table 1). This monitoring involved the use of a 2 person survey crew for 11 days and an additional 15 days of data entry and analysis time (Table 2).

Table 1. Status of physical habitat monitoring conducted on the East Fork of the South Fork of the Trask River between 1998 and 2000. (X) indicates that monitoring was conducted at a given time of year at a given site.

Site	Type of Site	Pre- Treatment Summer 1998	Post - Treatment Winter 1999	Post -Treatment Winter 2000
Main stem	Treatment	X	X	X
Main stem	Control	X		X
Unnamed tributary	Treatment	X	X	X
Unnamed tributary	Control	X	X	X

Table 2. Budget and time accounting for monitoring the physical habitat of the East Fork of the South Fork Trask River and an unnamed tributary.

Personnel Services	FTE	Time(months)	Cost/Month/FTE	Dollars
Surveying	2	0.4	1615	1292
Data Entry	1	0.25	2061	515
Analysis	1	0.5	2562	1281
Total Salaries				3088
OPE(39%)				1204
Total Personnel Services				4293
Services and Supplies				1073
Total Direct Costs				**5366**

Summary attributes for the four monitored segments are presented in Tables 3 and 4. The physical habitat surveys conducted at each site were highly variable. These surveys are typically only used to monitor a large number of sites across the landscape and are not well suited for monitoring change at one or two sites. The surveys also show seasonal variation that is evidenced by the larger channel areas, and higher numbers of deep pools in winter (Tables 3 and 4).

Before treatment with wood additions, the main stem monitoring segment was typified by a high amount of secondary channel habitat, low pool area, low area in dammed pools and a low number of deep pools. This segment also had low fine sediment, gravel and wood levels, especially key wood pieces. After treatment with wood, secondary channel area remained high, pool area increased, and the area in dammed pools and density of deep pools increased dramatically, especially as compared to the control segment. After treatment this segment also had high fine sediment levels and maintained moderate gravel levels. Wood levels were high, except for only a moderate increase in the density of key wood pieces.

The unnamed tributary segment was different from the main stem segment before treatment. The unnamed tributary was typified by a low amount of secondary channel habitat, moderate pool area, and low dammed pool area and density of deep pools. This segment had moderate fine sediment and gravel levels and low wood levels, especially key wood pieces. After addition of wood, the unnamed tributary segment had a high amount of secondary channel habitat, moderate pool area, increased dammed pool area and deep pool density, moderate fine sediment and gravel levels, high wood levels and low key wood piece density.

Substrate levels were highly variable between the four monitored segments over the two-year monitoring period. This variability may be due to a variety of factors including seasonal variation, observer variability and natural variability associated with how different wood configurations influence the trapping and sorting of sediments under different flow regimes.

Table 3. Habitat attributes for the East Fork South Fork Trask River Main stem monitoring segments.

	Treatment			Control	
	Pre-Treatment Summer 1998	Post - Treatment Winter 1999	Post - Treatment Winter 2000	Pre-Treatment Summer 1998	Post - Treatment Winter 2000
Active Channel Width (m)	---	14.4	12.8	14.2	18.1
Primary Channel Length (m)	253	225	457	325	229
Channel Area (m^2)	1966	2935	4816	2109	3136
Secondary Channel Area (%)	27	38	25	14	22
Pool Area (%)	8	42	21	19	31
Dammed Pool Area (%)	0	11	7	0	2
Deep Pools (# / km)	2.9	20	12.3	5	7.5
Riffle Fines (% of area)	3	21	14	2	26
Riffle Gravel (% of area)	33	46	54	27	41
Total Fines (% of area)	2	30	26	6	29
Total Gravel (% of area)	19	24	36	28	35
Wood Pieces (# / 100 m)	1	66	36	3	19
Wood Volume (# / 100 m)	0	69	38	11	41
Key Wood Pieces (# / 100 m)	0	5.8	0.9	0	1.7
Wood Jams (# / km)			24.1		4.4

Table 4. Habitat attributes for the East Fork South Fork Trask River unnamed tributary monitoring segments.

	Treatment			Control		
	Pre-Treatment Summer 1998	Post - Treatment Winter 1999	Post - Treatment Winter 2000	Pre-Treatment Summer 1998	Post - Treatment Winter 1999	Post - Treatment Winter 2000
Active Channel Width (m)	3.6	7.3	5.5	4.8	5.5	5.2
Primary Channel Length (m)	315	347	358	307	267	303
Channel Area (m^2)	700	1900	1672	759	1148	1351
Secondary Channel Area (%)	0	25	18	6	1	3
Pool Area (%)	21	20	25	16	21	20
Dammed Pool Area (%)	0	5	6	0	1	3
Deep Pools (# / km)	0	3.7	2.0	0	0	0
Riffle Fines (% of area)	8	23	17	29	5	22
Riffle Gravel (% of area)	63	39	66	58	19	52
Total Fines (% of area)	18	32	31	29	17	36
Total Gravel (% of area)	60	33	54	49	20	42
Wood Pieces (# / 100 m)	4	37	29	9	33	15
Wood Volume (# / 100 m)	8	79	40	17	101	30
Key Wood Pieces (# / 100 m)	0.3	0.6	0.6	0	2.2	2.3
Wood Jams (# / km)		---	16.8			0.0

Many differences were observed in the treated segments between the summer pre-treatment surveys and the winter post-treatment surveys. Many of these changes were also observed in the control stream segments. Many of the changes can be attributed to seasonal variation, resulting from higher water levels in winter. However, for some attributes, the changes observed in the treated segments exceeded those observed in the control segments. These differences were observed for the percent dammed pool area, the density of deep pools, wood piece density, wood volume density, and wood jam density (Table 5). In the case of the East Fork Trask River monitoring, changes were not observed in the density of key wood pieces. This was due to the small diameter of the whole trees that were placed and the short length of the cut stumps that were placed. A key piece must be 0.6 m diameter and 9 m in length to be counted in a survey.

Table 5. Changes in habitat attributes resulting from placement of wood into stream segment s of the East Fork South Fork Trask River and an unnamed tributary.

Attribute	Effect
Secondary Channel Area (%)	Unknown effect
Pool Area (%)	Unknown effect
Dammed Pool Area (%)	Positive
Deep Pools (# / km)	Positive
Riffle Fines (% of area)	Unknown effect
Riffle Gravel (% of area)	Unknown effect
Total Fines (% of area)	Unknown effect
Total Gravel (% of area)	Unknown effect
Wood Pieces (# / 100 m)	Positive
Wood Volume (# / 100 m)	Positive
Key Wood Pieces (# / 100 m)	Negative
Wood Jams (# / km)	Positive

Discussion

It appears from the monitoring that has been conducted between 1998 and 2000 that the channels are beginning to change to those conditions that favor survival of juvenile salmonids. The increase in dammed pool area and deep pools after treatment is important for improving winter refuge habitat for salmonids. The average winter dammed pool area in the two treated areas was 7 percent of the channel area. In other coastal streams in Oregon the average winter dammed pool area is near 3 percent (ODFW unpublished data). The increased dammed pool area is consistent with other wood placement projects conducted in western Oregon.

These wood placements conducted in the East Fork South Fork Trask River do lack one important element and that is key wood pieces. This lack of key wood pieces may allow significant movement of smaller wood pieces and will allow the projects to revert to their previously simplified state. These sites would still benefit from the addition of large key wood pieces for stability.

In most other coastal restoration projects the density of key wood pieces increases dramatically after treatment with an average of 1.6 key pieces per 100 m of stream channel post-treatment (ODFW unpublished data). In the East Fork Trask River Project, key piece density was only 0.8 in the winter of 2000 following treatment.

Wood levels did increase in the control segments over the period that the sites were monitored. This change in wood levels may be from wood moving out of the treated segments downstream into the control segments. In the future it would be helpful to locate control segments both upstream and downstream of the project areas to determine if wood and sediment movement is a factor in the habitat changes that are occurring.

This monitoring project was developed as a side project within the overall monitoring being conducted for the Western Oregon Stream Project. The East Fork South Fork Trask River monitoring would be better combined with the other 40 sites that are being monitored in Western Oregon for determining if wood placements are benefiting salmonid habitat.

References

Moore, K. M. S., K. K. Jones, and J. M. Dambacher. 1997. Methods for stream habitat surveys. Oregon Dept. of Fish and Wildlife information report 97-4. 40 pp

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